AMENDMENTS TO THE SPECIFICATION

Please replace the paragraph beginning on page 17, line 12 with the following:

In Fig. 4, shuttle 32 includes blade carrier 13a disposed outside the C-shaped channel defined by stator housing 10, and blade set 11a extending into the channel of stator housing 10. Here, blade carrier 13a may serve as the carriage which drives other structure(s) attached thereto in a linear fashion. Interleaved with the blades 9a of shuttle blade set 11a are the blades 9b of stator blade set 11b. In this embodiment, the active component of the motor is associated with stator 10 which includes three phases arranged serially along the actuation axis. Each phase includes flux return portion 17 and coil 60 wound to produce flux through the sets of interleaved blades 9a and 9b in a direction transverse to the actuation axis of the motor. Figs. 5-6 provide similar views to that of Fig. 4.

Please replace the paragraph beginning on page 19, line 1 with the following:

So far, the blades of the stator and the shuttle have been shown to be straight but that is not a necessary limitation of the subject invention as shown in Fig. 11 where both the stator 9b' and shuttle 9a' blades are bent or have an extended root portion or otherwise bend or flex to provide a close blade spacing (e.g., .0005" to .003") while allowing significant lateral (e.g., ± .005" to .010") motion of the shuttle. Thus, in Fig. 11, outer gap 151 is larger than the average gap between the interleaved blades. Or, the root 29, Fig. 13 of the shuttle blades ~~teeth~~ can include[[s]] flexural features to allow bending or flexing of the blades when the interleaved

blades are very closely spaced. This method provides lateral play without increasing the gaps between blades. In one example, as shown in Fig. 13, the root 29 of the shuttle blade is thinned down. In the embodiment shown in Fig. 14, the root 29 of the teeth are formed with slots 150 to provide flexure and in Fig. 15 different kind of slots 152 are shown. The result is a blade relatively stiff in the axial direction but compliant in the lateral direction.

Please replace the paragraph beginning on page 21, line 9 with the following:

Phases B and C are constructed in a similar fashion each having their own coil, flux return plates, and blades except that, as noted above, the blades of phase B of stator 10 are offset 1/3 of a tooth pitch from the blades of phase A and the blades of phase C are offset by 1/3 of a tooth pitch from the blades of phase B. Structural spacers 70 ~~and housing 72~~ support phases A and B to phase C, and phase C is supported by the structural I-bean column 55. At the base of this column, the structural housing 72 and the column 55 are attached. These components complete the primary components of stator 10 ~~shuttle 32~~ resulting in [[a]] shuttle Figs. 17 and 32 telescopingly received in stator 10.

Please replace the paragraph beginning on page 21, line 17 and ending on page 22, line 1 with the following:

Figs. 19-22 show an example where the motor is cylindrical in shape but otherwise the same reference numerals are used to denote structures similar to the structures of Figs. 16-18. As shown in Fig. 19, sliding bearings 100 and 104 allow[[s]] shuttle 32 to telescopingly move up

and down along actuation axis 16 within stator 10. Limit stop 102 prevents further travel of shuttle 32 and flange 106 supports the active stator section 10. I-beam stator support column 55 is secured in base 108. Fig. 19 also shows the retracted height of shuttle 32, the active stator section, and the stroke of shuttle 32.

Please replace the paragraph beginning on page 24, line 7 with the following:

Assuming the use of M19 silicon/iron alloy, a blade thickness of .015", a tooth pitch of .036", a tooth width of .018", and an average air gap of .001", a finite element magnetic analysis predicts a shear pressure as a function of tooth alignment and flux density as shown in Fig. 23. The flux density shown in the legend in this case represent the equivalent flux density if all the flux were to go through the blade teeth. In other words, the average flux density through the stack is half the values given in the legend (in units Tesla). While this data is based on the tooth width being half of the tooth pitch, other ratios of width/pitch are also acceptable. Use of width/pitch ratio of ~~7.5~~ .55 may be beneficial to increase blade stiffness and strength and to reduce wear. Use of a width/pitch ratio slightly less than .5 provides similar shear pressure but requires less flux, thus reducing the size of the flux-return for a given force rating.

Please replace the paragraph beginning on page 25, line 2 with the following:

To produce a constant force, the current to each of the three phases should be modulated as a function of commanded force and shuttle position. Figs. 25-27 show the preferred way to transition from one phase (phase A) to an adjacent phase (B or C), assuming a three-phase

machine with the same tooth geometry as in the previous figures. Two sets of transition curves are shown, assuming a commanded shear pressure of 2 and 4.4 psi. The transition curves assume quasi-static operation and are optimized for minimum resistive losses.

Please replace the paragraph beginning on page 25, line 17 and ending on page 26, line 12 with the following:

As shown in Fig. 20 in particular, interleaved shuttle blades 37 and stator blades 15 have almost no gap therebetween and during actuation the blades will touch and rub against each other. Since the rate of travel of shuttle 32 is relatively slow, however, wear is not a primary concern. Instead, by making the blades relatively thin, the blade density can be increased resulting in a large force density. The conventional wisdom is that each blade must be sufficiently thick and stiff to support itself and/or that the ~~gasp~~ gaps between the blades must be large. The truth is that in a relatively slow moving motor the blades can actually touch and rub against each other. And, the added benefit of reducing the extent of the gaps between the blades is reduce losses and less coil ~~is~~ current is required to generate the necessary flux. Thus, in one example of the subject invention, the blades are relatively thin .020" (e.g., .020") and the gaps between adjacent blades extremely small .002" (e.g., .002") or smaller such that the blade density is substantially increased resulting in a larger or force density and reduced losses and coil current required to generate the necessary flux. Use of very small air gaps also reduces the lateral magnetic pressure tending to attract the faces of the blades together. If a blade is exactly centered between adjacent blades, the attractive forces cancel. Due to magnetic instability, however, a blade will be drawn to one side or the other, but, by minimizing the air gap the net

lateral force is minimized, thus reducing friction and wear.

Please replace the paragraph beginning on page 26, line 13 and ending on page 27, line 3 with the following:

Figs. 28-30 show another linear reluctance motor 100 in accordance with this invention having an actuation axis 102. Here, shuttle 104 includes three serially aligned phases A, B, and C, Fig. 30, and, associated with each phase a blade set 106, a flux return portion 110, and a coil 112 wound to produce flux through the sets of interleaved blades of the stator and shuttle in a direction substantially transverse to the actuation axis. Stator 114, Fig. 28 includes blade set 116 extending into the channel of stator housing 130 and interleaved with the ~~teeth of the three~~ blade set[[s]] of shuttle 104. Structural spacers 120, Fig. 30 (preferably non-magnetic) separate the phases of shuttle 104. The result is a long passive stator and in comparison a relatively short active shuttle providing a long stroke, low weight, and low power consumption. Whatever is to be driven by shuttle 104 is attached to driving element 122 by mounting features 124. Driving element 122, external to stator housing 130, is connected to flux return portions 110 of shuttle 104 within the C-shaped channel 129 of stator housing 130, Fig. 29 by fin 132 which is received in longitudinal slot 134 of stator housing 130.

Please replace the paragraph beginning on page 28, line 4 and ending on page 29, line 3 with the following:

In the construction of Figs. 34-37, the phases are distributed both axially and laterally.

Shuttle 250, Fig. 36 is active and includes push rod 252 terminating in mounting feature 256 and enclosing coil wires 258. Stator 260 includes the housing as shown with mounting feature 262 and vent hole 264 which can be pressurized or depressurized for pressure equalization with a pressure fitting serving as vacuum compensation means or could be attached to a filter to allow venting to the atmosphere but rejecting corrosive fluids, dust, and the like ~~as shown in Fig. 35~~. The blade sets 280, 282 are associated with phase A, and blade sets 284 and 286 are associated with phase B, and thus phases A and B are arranged laterally. Phases C and D are also lateral to each other but are axially disposed with respect to phases A and B. The phases of stator 260 are thus arranged to provide phases distributed both axially and laterally combined with the flux return portion 290 of shuttle 250 and coils 292 and 294 of the shuttle and shuttle teeth sets 300, 302, 304, and 306. A more complete view of the shuttle is shown in Fig. 37 where coil 292 and shuttle blade sets 300 and 302 define phase A, coil 294 and shuttle blade sets 304 and 306 define phase B and a similar arrangement as shown at 320 define phases C and D. Structural non-magnetic spacer element 322 separates the phase A and B coils from the phase C and D coils as shown and in combination with push rod spacer 324 and tie rods 326 form the structure of the active shuttle. Stator 260 thus includes one pair of adjacent blade sets 280 and 282 opposing another pair of adjacent blade sets 286 and 284. Shuttle 250, in turn, includes first pair of adjacent blade sets 300 and 302 opposing a second pair of adjacent blade sets 304 and 306 defining phases A and B and, as shown at 320, a third pair of adjacent blade sets 307 and 309 opposing a fourth pair of adjacent blade sets defining phases C and D.

<u>Please replace the paragraph beginning on page 29, line 11 with the following:</u>

Figs. 40, 42 and 43 shown passive ~~stator~~ shuttle 400 and active ~~shuttle~~ stator 402 both of which move in the direction of actuation axis 404.

Please replace the paragraph beginning on page 29, line 13 with the following:

The result is a linear motor having a long passive shuttle and a short active stator. Fig. 40 shows the shuttle ~~40~~ 400, the stator 402, and the direction of motion 404.

Please replace the paragraph beginning on page 30, line 14 with the following:

Figs. 44-48 show passive shuttle 480 with opposing inwardly facing blade sets 482 and 484 and active stator 490 with opposing outwardly facing blade sets ~~494~~ 492 and 494 and coil[[s]] 496 and 498. Structural I-beam 500, Fig. 46 supports the active part of the stator similar to the embodiment of Figs. 16-18.